

Description

Gas regulating fitting

Technical field

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The invention relates to a gas regulating fitting for a gas fire or the like in accordance with the first patent claim.

Present technology

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There are many different types of gas control devices for a gas fire or the like. Their function is to ignite and control or regulate the flow of gas flowing to a burner.

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For instance, DE 197 46 788 C1 describes a gas regulating fitting intended to be fitted mainly in a gas-heated fire installed in the fireplace or the like. The valve enables the burner to be operated and monitored. The burner is divided into a pilot burner and a main burner. To cater for this structure the gas regulating fitting has a start-up system with a flame failure device and a safety interlock to prevent re-ignition, together with a control unit to control the volume of gas flowing into the main burner. The gas flow flowing to the pilot burner is manually ignited by a piezoelectric igniter forming part of the start-up system.

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A similar gas regulating fitting is known from DE – application ref. 103 05 929.6.

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This gas regulating fitting also has a start-up system with a flame failure device and a control unit to control the volume of gas flowing to the main burner. However, with this gas regulating fitting, control and ignition are provided by an electronic control unit. An option with this device is for the flow of gas flowing to the pilot burner to be ignited by a piezoelectric igniter as well.

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A disadvantage with both versions is that the pilot flame continues to burn from the time the gas fire is started until it is switched off.

Description of the invention

5 The task of the invention is to devise a gas regulating fitting which, after the gas fire has been started up, moves the pilot burner to the off position as well when the main burner is in the off position. The aim of this is to keep the gas fire's energy consumption to the minimum. In addition, the gas regulating fitting is to be of as simple a construction as possible.

10 The problem is solved in accordance with the invention by fitting a sensor to the gas regulating fitting by means of which the operating condition of the main burner can be ascertained. To that end the sensor is connected in such a way to the thermoelectric flame failure device valve that on a change in the main burner's operating condition from "On" to "Off", the thermoelectric flame failure device valve  
15 assumes its closed position in response to a signal emitted by the sensor.

In this way a solution was found of eliminating the disadvantages in the current state of technology referred to above. At the same time the solution commends itself by the simplicity of its structure and mode of operation.

20 The other patent claims form the basis of additional advantageous versions of the invention.

An advantageous version of the gas regulating fitting is produced by positioning a  
25 time delay element between the sensor and the thermoelectric flame failure device valve. In this way brief disconnections of the main burner can be blanked out in order to avoid frequent ignitions with a consequent strain on the ignition device.

In addition, different types of sensors can be used. The sensor can consist of a  
30 flow sensor that checks whether a flow of gas is flowing to the burner by ascertaining the operating condition of the main burner.

- Control unit 8 to control the volume of gas flowing to the main burner 33

For the start-up system 7 an operating rod 10 is carried longitudinally in a bearing 9 of the housing 1. The rod is activated by the remote control unit 6 via an electromagnet 11 positioned on the housing 1 with the necessary gas tightness being  
5 ensured by round rings 12, for example.

Movement in a longitudinal direction is possible here only against the force of a return spring 13 supported in the housing 1. The starting position to be assumed  
10 under the force of the return spring 13 is reached by means of a counter bearing 14 located on the operating rod 10. In the starting position the counter bearing is in contact with a stop that is not illustrated. The end of the operating rod 10 extends into the interior of the housing 1.

15 The interior of the housing 1 is divided by a partition 15 into different chambers. Aligned in the extension of the operating rod 10, the partition 15 has an initial aperture 16, which on one side together with a valve head 36 located on the operating rod 10 forms a main valve 35 and on the other side forms part of a flame failure device valve 17. The pilot gas outlet 3 is located between the flame failure device valve 17 and the main valve 35 within the aperture 16. The flame failure device valve 17 is activated by a thermoelectric flame failure device magnet 18 positioned in a bearing of the housing 1 and made gastight. The magnet is located downstream of the gas inlet 2. The thermoelectric flame failure device magnet 18 acts on an anchor 19 that is connected rigidly to a valve rod 20 on which the valve  
20 head 21 of the flame failure device valve 17 is attached. The thermoelectric flame failure device magnet 18 is energised by the electronic control unit 5 as well as by a thermo element 22 exposed to the pilot flame.

Experts in this field are however familiar with the structure and mode of operation  
30 of the flame failure device magnet 18 so that it is unnecessary to go into any further details. All that remains to be emphasised is that a return spring 23 seeks to

A particularly simple solution is where the sensor consists of a temperature sensor that ascertains the operating condition of the main burner by the temperature at the main burner.

- 5 A further possibility is to place the sensor right by the control unit controlling the volume of gas flowing to the main burner in order to ascertain the operating condition of the main burner.

#### Execution example

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The gas regulating fitting in accordance with the invention will now be explained in more detail by means of the following execution example. The execution example shows in schematic representation a version of a gas regulating fitting in cutaway view in the open position.

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The example of the gas regulating fitting in accordance with the invention illustrated in the figure is a switching and control device intended mainly for installation in a gas fire or the like. It enables a burner to be operated and monitored by controlling the volume of gas flowing to the burner. In this execution example the

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burner consists of a pilot burner 32 and a main burner 33.

The gas regulating fitting consists of a housing 1 with a gas inlet 2, a pilot gas outlet 3 and a main gas outlet 4. The individual functional units are located in the housing 1.

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An electronic control unit 5 serves as a means of control and in this execution example is located together with a power source in a separate housing of a remote control unit 6 that can be at a different location.

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The following functional units are housed in the gas regulating fitting illustrated:

- Start-up system 7 with flame failure device and main valve 35

heated. On further activation of the drive unit 31, the volume of gas flowing to the main burner 33 is steadily increased. From this point the switch 24 is in modulating operation and the valve 25 is steadily opened until the maximum volume of gas has been reached.

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If, owing to a reduced demand for energy, the switch 24 is now closed by the drive unit 31, i.e. first the valve 25 and then the valve 26 is closed as well, the flames of the main burner 33 are extinguished, thereby causing a fall in the temperature at the temperature sensor 34. This information is evaluated in the electronic control unit 5, whereupon the thermoelectric flame failure device valve 17 is closed. As  
10 already previously indicated, the thermoelectric flame failure device valve 17 in this execution example does not close immediately but only after a time delay. This is to avoid re-ignition of the pilot burner 32 with a resultant additional load on the ignition device, should a brief re-ignition of the main burner 33 be necessary,  
15 as can happen with room temperature controls in particular.

The gas regulating fitting in accordance with the invention is not, of course, restricted in its application to the execution example illustrated. On the contrary, changes, modifications and combinations can be made within the framework of  
20 the invention.

For example, the gas regulating fitting can, of course, have additional functional units, such as a pressure regulator and the like, apart from the units referred to previously. In addition, checks on the temperature at the temperature sensor 34  
25 can be made at specified intervals rather than continuously, and/or can be made only when the drive unit 31 is activated.

Furthermore, the thermoelectric flame failure device valve 17 can be controlled and switched off directly, if for example there is no electronic control unit 5.

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pull the anchor 19 from the flame failure device magnet 18 over the valve head 21 serving as a spring bearing.

5 A switch 24 forming part of the control unit 8 is located in the direction of flow behind the start-up system 7 within the housing 1. The switch 24 is of a known design. It is designed in such a way that the valve 25 provides a modulating control and the valve 26 provides abrupt switching on and off in partial load operation, with the flow of gas for partial load operation being limited by the cross-section of the aperture 27 located in the partition.

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The plunger 28, which is connected to the switch 24 and actuated by spring force, is movable longitudinally. The plunger protrudes from the housing 1 which at the same time forms a bearing 29 for it. The required gas tightness is achieved by the use of a round ring 30, for example. The plunger 28 is connected by its end facing  
15 away from the switch 24 with a drive unit 31 that is not explained in detail as experts in this field will be familiar with its operation. The drive unit 31 is controlled by the remote control unit 6 via the electronic control unit 5.

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A temperature sensor 34, in this example a NTC resistance temperature sensor, is fitted in the immediate vicinity of the flames of the main burner 33. The sensor is connected electrically to the electronic control unit 5, which for its part already has a connection for controlling the flame failure device magnet 18 of the thermoelectric flame failure device valve 17. For reasons that are explained in more detail later, a time delay unit is connected in series in the electronic control unit 5.

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The mode of operation of the gas regulating fitting is as follows:  
After start-up and resultant ignition of the pilot flame by means of an ignition electrode 37, the drive unit 31 is activated by the remote control unit 6 and the electronic control unit 5. This opens the switch 24 in a manner that is known: the  
30 switch opens abruptly. The constant volume of gas limited by the aperture 27 flows via the main gas outlet 4 to the main burner 33 where it is ignited by the pilot flame. The flames burn at a minimum height and the temperature sensor 34 is